

XXXIV.—*Remarks on the present State of the Systema Avium.* By P. L. SCLATER. ★

It will be generally allowed, I believe, by all ornithologists that the *Systema Avium* is not at present in a very satisfactory state. The Cuvierian arrangement and its modifications have been broken down by the criticisms of modern inquirers; but no other system has arisen to take its place, or, at all events, has secured general adoption. The subject being, as will be universally allowed, one of the utmost importance, I have thought it possible that my brother workers might like to hear what my views are upon the question.

Up to 1873, as regards general arrangements, I had acquiesced, more or less, in the modified Cuvierian system employed by G. R. Gray in his well-known works. I had, however, long before quite come to the conclusion that the true *Passeres* were the most highly developed order of birds, and should be placed at the head of the series, and that the *Fissirostres* and *Scansores*, which in Gray's system merely figure as subdivisions of the *Passeres*, should stand as separate orders. I had also made up my mind that, as regards the subdivisions of the *Passeres*, Müller's discoveries as to the form of the larynx and the arrangement of its muscles could not be passed over. Accordingly, in the catalogue of my collection of American birds, published in 1862, I arranged the three first orders of birds (as I then considered them), to which my collection was restricted, as follows:—

Ordo PASSERES.

Sectio *Oscines*.

- | | |
|--------------------|------------------|
| i. Turdidæ. | x. Vireonidæ. |
| ii. Cinclidæ. | xi. Laniidæ. |
| iii. Sylviidæ. | xii. Ampelidæ. |
| iv. Paridæ. | xiii. Cœrebidæ. |
| v. Certhiidæ. | xiv. Tanagridæ. |
| vi. Troglodytidæ. | xv. Fringillidæ. |
| vii. Motacillidæ. | xvi. Alaudidæ. |
| viii. Mniotiltidæ. | xvii. Icteridæ. |
| ix. Hirundinidæ. | xviii. Corvidæ. |

Sectio *Tracheophonæ*.

- | | |
|-----------------------|--------------------|
| xix. Dendrocolaptidæ. | xxii. Tyrannidæ. |
| xx. Pterotochidæ. | xxiii. Cotingidæ. |
| xxi. Formicariidæ. | xxiv. Phytotomidæ. |

Ordo FISSIROSTRES.

- | | |
|------------------|--------------------|
| i. Momotidæ. | vi. Trogonidæ. |
| ii. Todidæ. | vii. Caprimulgidæ. |
| iii. Alcedinidæ. | viii. Cypselidæ. |
| iv. Galbulidæ. | ix. Trochilidæ. |
| v. Bucconidæ. | |

Ordo SCANSORES.

- | | |
|-------------------|----------------|
| i. Cuculidæ. | iv. Picidæ. |
| ii. Rhamphastidæ. | v. Psittacidæ. |
| iii. Capitonidæ. | |

This arrangement of the three first orders of birds I employed until 1872, allowing the Accipitres to succeed, and the remaining orders to follow, according to the Grayian system. But in 1872 it was necessary to decide what arrangement should be employed for the remaining orders in the list of Neotropical birds ('*Nomenclator Avium Neotropicalium*') which I was then preparing together with Mr. Salvin*. In the mean time the famous investigations of Prof. Huxley on the bones of the palate in the class of birds had taken place, and an entirely new arrangement of the class, consequent upon these investigations, had been promulgated. Having long entertained serious doubts as to the validity of the Grayian system, especially as to the groups associated together in the orders Grallæ and Anseres, I was pleased to find an alternative which had the sanction of high authority. Prof. Huxley had commenced his "*Systema*"† with the lowest and most reptilian birds, and had ended it with the highest and most specialized. But it seemed to me that, by exactly reversing this arrangement, I should obtain a scheme which would not very far deviate from that which I had already employed as to the first three orders, and would offer many improve-

* [The arrangement adopted in the '*Nomenclator*' is entirely Mr. Sclater's. I was forced to desert my colleague when I visited Central America in 1873-4, a portion only of this work having been then printed and the Introduction unwritten.—O. S.]

† P. Z. S. 1867, p. 456.

ments on the Grayian system in the remainder. In the introduction to the 'Nomenclator,' accordingly, I gave the subjoined scheme as that which I proposed to employ for the general arrangement of living birds, dividing them into 21 orders, as follows :—

Subordo I. AVES CARINATÆ.			
Series	Series	Series	Series
<i>Ægithognathina.</i>	<i>Desmognathina.</i>	<i>Schizognathina.</i>	<i>Dromæognathina.</i>
1. Passeres.	4. Coccyges.	11. Columbæ.	19. Crypturi.
2. Cypseli.	5. Psittaci.	12. Gallinæ.	
3. Pici.	6. Striges.	13. Opisthocomi.	
	7. Accipitres.	14. Grues.	
	8. Steganopodes.	15. Limicolæ.	
	9. Herodiones.	16. Gaviæ.	
	10. Anseres.	17. Pygopodes.	
		18. Impennes.	
Subordo II. AVES RATITÆ.			
	20. Apteryges.		
	21. Struthiones.		

I will now proceed to make a few remarks upon each of these orders, and to state where I think there are improvements still to be effected in the arrangement. It must, however, be always recollected that, although a linear system is an absolute necessity for practical use, it can never be a perfectly natural one. It will always be found, in any linear arrangement, that certain groups are nearly equally related to other groups at quite different parts of the series, and that it is a question of no little difficulty with which of these to place them; but we must, nevertheless, do our best to make the most natural linear arrangement that is possible for practical use.

1. PASSERES.

After eliminating the Scansores and Fissirostres of the Cuvierian system, the remainder of the Insesores constitute a tolerably homogeneous group, which, it is now generally acknowledged, form one of the main divisions of the Class of Birds. They are the Passerinæ of Nitzsch*, the Oscines

* 'Obs. de Avium arteria carotide communi.' Halæ, 1829.

of Sundevall's 'Tentamen'*, the Coracomorphæ of Huxley; but I see no reason why we should not retain for them the old Linnean name of Passeres.

There are still several forms regarding which their collocation in the Passeres thus understood is a matter of dispute. These are mainly as follows:—

1. *Upupa*. Sundevall places *Upupa* near the Larks, at the commencement of his second series of Oscines (the "Oscines scutelliplantares"), with which it agrees in the structure of the plantar scutes ('Tentamen,' p. 55). Nitzsch associates *Upupa* with *Buceros* and *Alcedo* in his family *Lipoglossæ* of the *Picariæ*. There can be no longer any question, I think, that the latter view is correct, and that *Upupa* is more nearly allied to the *Bucerotidæ* than to any other group. Some of the thin-billed *Bucerotidæ* of the genus *Toccus* even resemble *Upupa* in habit and external appearance. The palate of *Upupa* at once shows that it is no Passerine bird†. Next to the *Upupidæ* must come also the small African group *Irrisoridæ*, as was first suggested by Strickland, and has been amply shown by Dr. Murie in his excellent dissertation on the *Upupidæ* and their relationships‡.

2. *Eurylæmus*. The *Eurylæmidæ* were placed by Gray and most of the older authors near the Kingfishers and Motmots, *i. e.* outside the Passeres, as now restricted. Mr. Wallace, I believe, first started the idea that they are the representatives of the *Cotingidæ* in the Old World, and has thus arranged them in his 'Geographical Distribution'§. There is now no doubt that the *Eurylæmidæ* are truly Passerine, as I pointed out in this Journal in 1872, from an examination of the sternum||, and as Mr. Garrod subsequently confirmed from the form of the palate¶, although they are singularly divergent from all other known Passeres in having the *flexor*

* In Sundevall's former arrangement (*Orn. Syst.* 1836) they were denominated *Volucres*, and divided into two main groups, *Passeres* and *Oscines*.

† Cf. Huxley, *P. Z. S.* 1867, p. 447.

‡ *Ibis*, 1873, p. 181.

|| *Ibis*, 1872, p. 177.

§ Vol. ii. p. 294.

¶ *P. Z. S.* 1877, p. 449.

hallucis longus connected by a vinculum with the *flexor digitorum profundus*.

3. *Todus*, associated by Cabanis with *Todirostrum* in the Tyrannidæ, and by Sundevall with the Piprinæ, should be correctly placed, as I have already shown*, from its sternal characters, next to the Momotidæ, and has nothing to do with the true Passeres. The pterylosis confirms this view†.

4. *Euryceros* was formerly referred by Gray to the Bucerotidæ, but at my suggestion, I believe, was removed in his last work ('Hand-list,' ii. p. 21) to a much more natural position among the Sturnidæ. A glance at its feet is sufficient to show that it is a laminiplantar Oscine. Mr. Sharpe has recently included *Euryceros* in the heterogeneous assemblage which he has united under the title of Prionopidæ. I fail to see that it has any connexion at all with the other genera placed in that group.

5. *Falculia*, also a laminiplantar Oscine, has been hitherto usually associated with the Hoopoes, to which it has no sort of relationship (cf. Murie, Ibis, 1873, p. 201). It is certainly either a Sturnine or Corvine form; M. Milne-Edwards will probably soon tell us which.

The limits of the Passeres being now ascertained with tolerable certainty, the still more difficult question of the subdivision of the Order presents itself. On this subject Garrod's first memoir on the anatomy of the Passerine birds‡ gives us a summary of the latest information, not only as regards the lamented author's own elaborate investigations, but also as concerns the labours of previous authors. Garrod's proposed system for the arrangement of the Passeres is as follows:—

Passeres.	{	Acromyodi	{	Normales.	{	<i>Menura.</i>	
		(Oscines).		Abnormales.		<i>Atrichia.</i>	
	{	Mesomyodi.				Pipridæ.	
						Cotingidæ.	
				Heteromeri.		Tracheophonæ.	
				Homœomeri.		Haploophonæ.	

* Ibis, 1872, p. 177. See also Murie, Ibis, 1872, p. 410.

† Nitzsch, Pterylogr. p. 89.

‡ P. Z. S. 1876, p. 506.

In this scheme it will be observed that the Oligomyodæ, as, in accordance with Prof. Huxley's suggestion (P. Z. S. 1867, p. 471), the great American group of Passeres with only three pairs of singing-muscles was denominated in our 'Nomenclator,' are divided into two sections, and the Tracheophonæ are interposed between them. In consequence of the development of a femoral in the place of a sciatic artery, the Pipridæ and Cotingidæ (with the exception of *Rupicola*) are placed by themselves in a second primary division (*Heteromeri*) of non-Oscinine Passeres. But it seems to me that this arterial character, although no doubt of importance, is not as yet sufficiently understood and investigated to allow it to rank before the well-ascertained structure of the lower larynx. Again, it is quite obvious that the Acromyodi abnormales (i. e. *Menura* and *Atrichia*), although they approach the true Oscines in their syringeal structure, are divergent from the rest of the Passeres by much more important osteological characters. For the present, therefore, I am disposed to uphold the system of the division of the Passeres employed in the 'Nomenclator' as still the most convenient to be adopted, and to place the Acromyodi abnormales of Garrod (which, being extra-American, were not included in the 'Nomenclator') at the end of the Passerine series under the name Pseudoscines. The arrangement would then come out as follows :—

- i. Oscines.
- ii. Oligomyodæ.
- iii. Tracheophonæ.
- iv. Pseudoscines } *a.* Atrichiidæ.
 } *b.* Menuridæ.

We thus get the advantage of having what are certainly the most anomalous forms of Passerine birds yet known at the end of the series.

We must now approach the still more vexed question of the division of the Oscines into families. The difficulty here obviously arises from the fact that the Oscines are all very closely related to one another, and, in reality, form little more than one group, equivalent to other so-called families

of birds. As, however, there are some 4700 species of Oscines known, it is absolutely necessary to subdivide them; and the task of doing this in the most convenient and natural way is not an easy one.

Sundevall, who has certainly devoted more time and attention to the external characters of the Passeres than any other naturalist of this century, in his last work (*'Methodi Naturalis Avium disponendarum Tentamen,'* Stockholm, 1872) divided his "Oscines laminiplantares" (which are equivalent to the Passeres here considered, with the exception of the Larks) into six "Cohortes," as follows:—

i. Cichlomorphæ	50 fam.	iv. Certhiomorphæ	3 fam.
ii. Conirostres	15 „	v. Cinnyrimorphæ	5 „
iii. Coliomorphæ	15 „	vi. Chelidomorphæ	1 „

Sundevall's characters are derived partly from the structure of the bill and partly from other points, and his six primary divisions seem to me to be very naturally conceived. On the other hand, Mr. Wallace's well-known arrangement of the Passeres, first proposed in this Journal*, and subsequently followed in his great work on distribution, is based entirely upon the structure of the wing. Mr. Wallace's Formicaroid and Anomalous Passeres correspond nearly with what I call the Oligomyodæ, Tracheophonæ, and Pseudoscines, whilst the Oscines are distributed in his arrangement under three heads, as follows:—

Series A. TYPICAL OR TURDOID PASSERES.

Wing with 10 primaries, the first always more or less markedly reduced in size.

1. Turdidæ.	9. Phyllornithidæ.
2. Sylviidæ.	10. Pycnonotidæ.
3. Timaliidæ.	11. Oriolidæ.
4. Cinclidæ.	12. Campephagidæ.
5. Troglodytidæ.	13. Dicteruidæ.
6. Certhiidæ.	14. Muscicapidæ.
7. Paridæ.	15. Vireonidæ.
8. Leiotrichidæ.	16. Pachycephalidæ.

* Ibis, 1874, p. 406.

- | | |
|------------------|-------------------|
| 17. Laniidæ. | 20. Meliphagidæ. |
| 18. Corvidæ. | 21. Nectariniidæ. |
| 19. Paradiseidæ. | |

Series B. TANAGROID PASSERES.

Wing with 9 primaries, the first of which is fully developed and usually very long.

- | | |
|-----------------|-----------------|
| 1. Motacillidæ. | 6. Ampelidæ. |
| 2. Mnioiltidæ. | 7. Hirundinidæ. |
| 3. Cœrebidæ. | 8. Tanagridæ. |
| 4. Drepanidæ. | 9. Fringillidæ. |
| 5. Dicæidæ. | 10. Icteridæ. |

Series C. STURNOID PASSERES.

Wing with 10 primaries, the first of which is rudimentary.

- | | |
|--------------|--------------|
| 1. Ploceidæ. | 3. Artamidæ. |
| 2. Sturnidæ. | 4. Alaudidæ. |

The objection to this arrangement is that it separates some very nearly allied forms far too widely. The "spurious primary" which Mr. Wallace relies upon to divide his Tanagroids and Sturnoids is not always even a *generic* character. In *Vireo*, for example, it varies in the different species, being present in some and absent in others. Mr. Wallace puts the Alaudidæ amongst his Sturnoids; but in some Larks (*Calandrella* &c.) the spurious primary is altogether wanting. The Ploceidæ and Fringillidæ, which are barely distinguishable as families, fall under different heads, as do the Sturnidæ and Icteridæ. Yet there cannot be a doubt as to the intimate connexion of the two last-named families.

In my opinion Sundevall's groups of the Oscines are therefore far more naturally conceived; and in our 'Nomenclator' I have nearly followed them, using only the more familiar expressions ending in "rostræ," throughout the divisions. Thus :—

Sundevall's Cichlomorphæ	=Oscines denti-rostræ	of the 'Nomenclator.'
" Conirostræ	=Oscines conirostræ	"
" Coliomorphæ*	=Oscines cultri-rostræ	"
" Cinyrimorphæ	=Oscines tenuirostræ	"
" Chelidomorphæ	=Oscines latirostræ	"

* Mr. Sharpe's "Coliomorphæ" (Cat. Birds, iii. pp. 3, 4) is quite a dif-

No species of Sundevall's "*Certhiomorphæ*" being found in the New World, I have not given that group any equivalent designation. But calling these "*Oscines curvirostres*," for uniformity's sake; and keeping the Larks apart on account of their peculiar *planta*, I should propose to arrange the *Oscines* as follows:—

- | | |
|--------------------|------------------|
| A. Lamiplantares. | 1. Dentirostres. |
| | 2. Latirostres. |
| | 3. Curvirostres. |
| | 4. Tenuirostres. |
| | 5. Conirostres. |
| | 6. Cultriostres. |
| B. Scutiplantares. | (Alaudidæ.) |

These six groups may, I think, be separated without much difficulty. But when we come to attempt to subdivide them, there is room for endless varieties of opinion as to the nearest allies of many of the forms. It would, I fear, be impossible to discuss the best arrangement of the different subdivisions of these groups within the limits of this paper.

The second suborder of *Passeres*, the *Oligomyodæ*, are not nearly so numerous as the *Oscines*. It embraces, however, according to the present state of our knowledge, some 550 species, belonging to 8 families, most of which are restricted to the New World.

New World.
Oxyrhamphidæ.
Tyrannidæ.
Pipridæ.
Cotingidæ.
Phytotomidæ.

Old World.
Pittidæ.
Philippidæ.
 ———
Eurylæmidæ.

ferent group from that designated by Sundevall ('*Tentamen*,' p. 37) by the same name. Sundevall's *Coliomorphæ* is nearly equivalent to my "*Oscines cultriostres*" (Sundevall's group includes *Irrisor*, on which point see above, p. 343), and consists of the following families (according to my nomenclature):—*Icteridæ*, *Sturnidæ*, *Buphagidæ*, *Paradisidæ*, and *Corvidæ*. But Mr. Sharpe puts in his "*Coliomorphæ*" only the last two of these five families, and adds to them the *Oriolidæ*, *Dicruridæ*, and *Prionopidæ*. The first two of these belong to Sundevall's *Cichlomorphæ* (*i. e.* my *Dentirostres*); the last consists of a heterogeneous assemblage of genera, mostly also *Dentirostres*, but having, in my opinion, no sort of connexion together.

Of these the Eurylæmidæ must be deemed, without doubt, the most aberrant, on account of the non-freedom of the flexor hallucis, above alluded to, which is unique in the order of Passeres.

The third suborder of Passeres, the Tracheophonæ, distinguished by the peculiar structure of the syrinx, first described by Johann Müller, is entirely confined to the New World. According to my views, the 500 species which it comprehends should be divided into three families, the last of which is peculiar among all the Passeres in having a double notch at the posterior margin of the sternum. They are :—

Sterni postici fissura unica	} 1. <i>Dendrocolaptidæ</i> .
	} 2. <i>Formicariidæ</i> .
Sterni postici fissuris duabus	3. <i>Pterotochidæ</i> .

The fourth and last section of the Passeres, which I have proposed to call Pseudoscines, contains only the anomalous Australian forms *Atrichia* and *Menura*, which are each fully worthy of family rank. When some of the other obscure Australian forms (such as *Orthonyx*) have been further examined, it is very possible that additions will have to be made to this series.

2. CYPSELI sive MACROCHIRES.

It is now universally admitted that the *Cypseli*, although not Passerine, come near to that great Order in many particulars. Nitzsch, in 1829*, first constituted the group, to contain the Cypselidæ and Trochilidæ, and called them “Macrochires,” from the peculiar elongation of the bones of the manus. Sundevall, in 1836, adopted the term, and used the same limits. In his ‘Pterylographie,’ Nitzsch reduced the rank of the Macrochires to a family of his Picariæ—a group to which, however, he expressly states that he can assign no single peculiar pterylographic character. If we allow due value to palatal structure, we must keep the Macrochires and Pici apart from the rest of the Picariæ of Nitzsch, as Prof. Huxley has shown †,

* ‘Obs. de Avium arteria carotide communi.’ Halæ, 1829.

† P. Z. S. 1867, p. 468.

although he appears not to have fully realized the structure of the palate in the Trochilidæ*. In the 'Nomenclator' four families are assigned to the Order Macrochires—the Trochilidæ, Cypselidæ, Caprimulgidæ, and Steatornithidæ. Of these it is now quite certain, from Garrod's researches, that the last named must be removed to another situation, the palate being strongly desmognathous†. The best place, therefore, for *Steatornis*, according to my present opinion, is either as a family next to the Podargidæ, or, as the form presents so many strong peculiarities, as an independent order next to the Striges.

The Macrochires will therefore consist only of three families—the Trochilidæ, Cypselidæ, and Caprimulgidæ. No one, I believe, will now deny the close alliance of the first two of these families. As regards the Caprimulgidæ, they differ from the typical Macrochires not only in the lesser comparative development of the manus, but also in possessing cæca, and their position will require further consideration.

3. The PICI were first constituted a separate order by Sundevall in 1835‡, to consist of two families, the Picidæ and Iyngidæ. They are the exact equivalent of Prof. Huxley's Celeomorphæ. Garrod (P. Z. S. 1874, p. 123 *et alibi*) would associate with them the Rhamphastidæ and Capitonidæ, as "not in any point presenting family differences;" but if we follow Prof. Huxley in assigning a high value to the structure of the palate, it is quite evident that they should stand alone (*cf.* Huxley, P. Z. S. 1867, p. 468). There is no difficulty in distinguishing the Pici from all other birds—the structure of the tongue and of the feet is quite peculiar; and I think they must remain as an independent order or suborder.

[To be continued.]

* *Cf.* Parker, Trans. Linn. Soc. ser. 2, Zool. i. p. 116.

† *Cf.* Garrod, P. Z. S. 1873, p. 530.

‡ K. Vet. Ak. Handl. 1835, p. 68.